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Subject: Partial cutting ponderosa and Jeffrey pine stands in the Heart Rock area which are impacted by black stain root disease (FHP Evaluation NE02-11)

To: District Ranger, Big Valley Ranger District, Modoc National Forest

Black stain root disease (BSRD) continues to be active in the Heart Rock area in ponderosa/Jeffrey pine (PP/JP). Two silvicultural treatments were completed in the area since the 1980's in an attempt to control this disease. A clearcut eliminated BSRD inside the treatment but the disease continued outside. Likewise BSRD successfully infected pine trees on the "disease-free" side of a wide buffer strip that was cleared of all pine to prevent the root-to-root spread of the disease. In both cases, the disease was spread (and continues to be spread) by root feeding beetles that carry the black stain fungus, *Leptographium wagneri*, long distances from infected hosts to healthy hosts. It appears that densely stocked or otherwise stressed pine trees attract the beetles that can spread the disease.

Even though removing all host trees from a BSRD affected forest will control the disease, this treatment is not practical for the Modoc NF or even in the Heart Rock area since it would require clearcutting vast areas. A good way to manage BSRD, where the disease is widespread, is to aggressively thin the trees so that they grow vigorously, even during prolonged periods of below normal precipitation. Besides being resilient to stress, widely spaced trees have few root contacts which are required for tree-to-tree spread of BSRD and other root diseases.

The present proposal for the Heart Rock area is to reduce the basal area to 30 sq.ft., except in BSRD centers where all the trees will be removed (leaving less than 30 sq.ft. basal area overall). Also, there is a late seral stand in the project area where the target basal area is 80 to 100 sq.ft.

Thinning to 30 sq.ft. should successfully reduce tree susceptibility to BSRD and effectively limit the spread of the disease, should a tree become infected. In an earlier FHP evaluation (NE00-25), group selection around black stain centers in conjunction with aggressive thinning was offered as a good treatment to limit BSRD. Upon further consideration, the current proposal to reduce the basal area to 30 sq.ft. will achieve the same result as a combined treatment using both group selection and thinning, as long as all the trees which appear to have BSRD are removed. In addition, group selections alone, as applied on other Forests, have not been successful in controlling BSRD. Therefore, group selection should not be used here, except on a trial basis (such as in the late seral stand). If a group selection trial is desired, it is important to mark all the trees showing BSRD symptoms and allow the sale administrator to remove trees which develop BSRD symptoms after marking and prior to harvest.

During thinning operations, it is important to protect the roots of the residual pine trees from damage or soil compaction. Soil disturbance and compaction have been associated with BSRD in other



locations. It is also important not to harvest from approximately May 1st to July 15th since this is when the root feeding vectors of BSRD are most active

It should be mentioned that there are additional benefits associated with managing a forest of widely spaced trees. Some are: 1) Less frequent entries are needed for tree harvest, thus reducing soil disturbance and compaction. Both can stress trees and predispose them to BSRD. 2) Ability to maintain light ground vegetation and minimize dead fuel accumulation by conducting frequent underburns similar to those that occurred naturally more than a century ago. Fire returns nutrients to the soil and kills water-using plants. The extra nutrients and water in the soil can be used by the trees and result in faster growing, healthier trees. Vigorous trees are less susceptible to BSRD. By removing accumulating ground fuel, the threat of catastrophic, stand-replacing fires can be minimized. 3) The openness of the forest allows sunlight to reach more of the foliage as well as the forest floor. This provides solar energy to more of the needles which should increase tree growth and dry dew and precipitation from the crown. Moisture on the needles and branches often favors foliar and branch pathogens. An elevated soil temperature is unfavorable for *L. wagneri* and other root pathogens.

This project should be considered a test of the hypothesis that an aggressively thinned pine forest is less likely to experience newly vectored BSRD, less impacted by BSRD tree-to-tree spread, less susceptible to bark beetle mortality and less likely to experience stand replacing fires than surrounding overstocked forests. This experiment in BSRD suppression and prevention needs to be monitored over the next twenty years, or more, to evaluate the treatments against the hypothesis. Data on post-harvest soil disturbance, tree injury and tree spacing needs to be recorded soon after the project is completed. Latent or new BSRD and its spread needs to be recorded and related to stocking and site conditions over time. Results need to be documented to guide future insect and disease management strategies for pine forests where BSRD is a problem.

If you have questions or require additional information, please contact me. I am available to assist in training or advising marking and sale prep personnel.

/s/ Bill Woodruff

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